WE CLAIM:

1. A method of producing transduced mammalian T cells or non-dividing cells, the method comprising:

(a) obtaining a population of T cells or non-dividing cells from a patient; and

(b) transducing the population of T cells or non-dividing cells *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest.

2. The method of Claim 1 wherein said T cells are isolated CD4+ T cells.

3. The method of Claim 1 wherein said T cells are isolated CD8+ T cells.

4. The method of Claim 1 wherein the gene of interest encodes a protein or active portion of a protein selected from the group consisting of a cytokine, a colony stimulating factor, a clotting factor, and a hormone.

5. The method of Claim 4 wherein said clotting factor is factor VIII.

6. The method of Claim 1 wherein the patient is a human suffering from a disease selected from the group consisting of a genetic disease, a cancer, an infectious disease, an autoimmune disease, a cardiovascular disease, degenerative disease, and an inflammatory disease.

7. A composition comprising an isolated population of mammalian T cells or non-dividing cells, transduced *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant particles carry a vector construct encoding a gene of interest.

8. The composition of Claim 7 wherein said T cells are isolated CD4+ T cells.

9. The composition of Claim 7 wherein said T cells are isolated CD8+ T cells.

10. The composition of Claim 7 wherein the gene of interest encodes a protein or active portion of a protein selected from the group consisting of a cytokine, a colony stimulating factor, a clotting factor, and a hormone.

5 11. The composition of Claim 10 wherein said clotting factor is factor VIII.

12. The composition of Claim 7 wherein said mammalian cells are human cells.

13. A mammalian T cell or non-dividing cell transduced *ex vivo* with a preparation
10 of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest.

14. The T cell of Claim 13 wherein said T cell is from an isolated population of CD4+
15 T cells.

15. The T cell of claim 13 wherein said T cell is from an isolated population of CD8+ T cells.

20 16. The T cell or non-dividing cell of Claim 13 wherein the gene of interest encodes a protein or active portion of a protein selected from the group consisting of a cytokine, a colony stimulating factor, a clotting factor, and a hormone.

17. The T cell or non-dividing cell of Claim 16 wherein the clotting factor is factor
25 VIII.

18. A method of treating a patient having a genetic disease, the method comprising:
(a)   obtaining a population of T cells or non-dividing cells from the patient;
(b)   transducing the population of T cells or non-dividing cells *ex vivo* with a
30 preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest useful in treating the genetic disease; and
(c)   re-introducing into the patient a therapeutically effective amount of the
35 population of transduced T cells or non-dividing cells.

19.   The method of claim 18 wherein said cell population is a T cell population, wherein said disease is ADA deficiency, and wherein said gene of interest is ADA.

20.   The method of Claim 18 further comprising expanding the transduced population of T cells, non-dividing cells prior to re-introduction of the cells into the patient.

21.   A method of treating a patient having cancer, the method comprising:
   (a)   obtaining a population of T cells or non-dividing cells from the patient;
   (b)   transducing the population of T cells or non-dividing cells *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest useful in treating cancer; and
   (c)   re-introducing into the patient a therapeutically effective amount of the population of transduced T cells or non-dividing cells.

22.   A method of treating a patient having an infectious disease, the method comprising:
   (a)   obtaining a population of T cells or non-dividing cells from the patient;
   (b)   transducing the population of T cells or non-dividing cells *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest useful in treating the infectious disease; and
   (c)   re-introducing into the patient a therapeutically effective amount of the population of transduced T cells or non-dividing cells.

23.   The method of claim 22 wherein said cell population is a T cell population, wherein said infectious disease is AIDS, and wherein said gene of interest encodes a mutant HIV protein .

24.   The method of claim 22 wherein said cell population is a T cell population, wherein said infectious disease is AIDS, and wherein said gene of interest encodes a ribozyme.

25.   The method of claim 22 wherein said cell population is a T cell population, wherein said infectious disease is AIDS, and wherein said gene of interest encodes a synthetic or naturally occurring T cell receptor.

5   26.   A method of treating a patient having an inflammatory disease, the method comprising:

(a)   obtaining a population of T cells or non-dividing cells from the patient;

(b)   transducing the population of T cells or non-dividing cells *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from
10   contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest useful in treating the inflammatory disease; and

(c)   re-introducing into the patient a therapeutically effective amount of the population of transduced T cells or non-dividing cells.

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27.   A method of treating a patient having a degenerative disease, the method comprising:

(a)   obtaining a population of T cells or non-dividing cells from the patient;

(b)   transducing the population of T cells or non-dividing cells *ex vivo* with a
20   preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest useful in treating the inflammatory disease; and

(c)   re-introducing into the patient a therapeutically effective amount of the
25   population of transduced T cells or non-dividing cells.

28.   A method of treating a patient having a cardiovascular disease, the method comprising:

(a)   obtaining a population of T cells or non-dividing cells from the patient;
30   (b)   transducing the population of T cells or non-dividing cells *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus. wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest useful in treating the cardiovascular disease; and
35   (c)   re-introducing into the patient a therapeutically effective amount of the population of transduced T cells or non-dividing cells.

29. The method of claim 26 wherein said cell population is a T cell population, wherein said cardiovascular disease is hyperlipidemia, and wherein said gene of interest encodes apolipoprotein E.

30. A method of treating a patient having an autoimmune disease, the method comprising:

(a) obtaining a population of T cells or non-dividing cells from the patient;

(b) transducing the population of T cells or non-dividing cells *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a gene of interest useful in treating the autoimmune disease; and

(c) re-introducing into the patient a therapeutically effective amount of the population of transduced T cells or non-dividing cells.

31. A method of modulating the activity of a population of T cells or non-dividing cells in a patient comprising:

(a) obtaining the population of T cells or non-dividing cells from the patient;

(b) transducing said population of cells *ex vivo* with a preparation of high titer recombinant retroviral particles substantially free from contamination with replication competent retrovirus, wherein the recombinant retroviral particles carry a vector construct encoding a protein capable of activating a prodrug;

(c) re-introducing said population of cells into the patient; and

(c) administering said prodrug to said patient.

32. The method of claim 31 wherein said protein is thymidine kinase.

33. A method according to Claim 1 wherein an envelope protein of the high titer recombinant retroviral particles is an envelope protein derived from a type C retrovirus or from a type D retrovirus.

34. A method according to Claim 1 wherein an envelope protein of the high titer recombinant retroviral particles is an envelope protein is selected from the group consisting of a retroviral amphotropic envelope protein, a retroviral ecotropic envelope

protein, a retroviral polytropic envelope protein, a retroviral xenotropic envelope protein, a gibbon ape leukemia virus envelope protein, and a VSV-g protein.

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